The invention is concerned with the three-dimensional perceptible image representation and referred to a projection mechanism for Parallax Panoramagramme of the type indicated in the preamble of Claim 1.

A recapitulatory illustration of the bases and developments on the field of the “Three dimensional Imaging Techniques” obtain z. B. T. Okoshi (Academic press, New York 1976) and for the “Stereoscopy” L. S. Dudley, likewise Academic press, New York - San Francisco - London, 1965 in “Applied optics and Optical Engineering”, belt II, Chapter 2, sides 77 to 117.

In younger time these developments find again in connection with the advances of the optical communications technology, in particular the broadband communication, the new qualities for television systems and such possible to strong interest. Thus for example J. gave. F. Butterfield a “Survey OF threedimensional televison” (see. Proc. Optics and Photonics Applied ton of Three dimensional Imagery - IMAGE 3-D -, belt 212, 26. to 30. November 1979, Strasbourg (FR), sides 40 to 47, and to the same cause reported A. Marraud, M. Bonnet, A. Rambourg over “Lenticular sheet 3-D of pictures and 3-D Projections”, see. A. A. O., sides 48 to 51.

In “Proc. OF the IEEE " belt 68, No. 5, May 1980, sides 548 to 564 again T is concerned. Okoshi with “Three dimensional display”, and in “Proc. OF SPIE ", 21. /22. 1983, Geneva (CH), M. describe April to belt 402, sides 129/132. Marraud and M. Bonnet the “restitution OF A stereoscopic picture by means OF A lenticular sheet”.

The state of the art still documented in the patent literature refers beyond that partially to solutions for very particular objects, for which frequent, anyhow so far, became no or no wide application known. Concerning the subject-matter of the current invention the DE-OSn is 20 23 218, 27 27 642, 30 48 458 as well as the US-PSn 35 04 059, 34 82 913 and 35 08 920 as technological background for example to mention.

For the object, which is the basis for the invention, is in particular those other already above mentioned development on the field of optical broadband communication systems of decisive importance. The immaterial spread very high information rates over optical transfer channels permitted due to the high channel capacities to plan also terminals with very much higher range need than conventional. For distribution services, with which a large number of receivers to a substantial smaller number of transmitters is to be attached, above all inexpensive participant terminals for the reproduction are required. The respective photograph and transmission systems in relatively short time provided become according to experience, if the need for it is by already present rendition terminals strong enough.

The invention aims therefore last end off to create terminals for the reproduction from spatial perceptible optical impressions to and has the subsequent requirements to therefore fulfill:
a) Objects in the shown space should be more perceptible with depth effect;
b) the illustrations are to be able to become simultaneous by several viewers perceived;
c) the viewing positions should be in as small a periphery as possible localbound;

d) the viewers are to get along without additional optical expedients;
finally are
e) colored,
f) moved and
g) wide images - diagonal about 2.5 m - to represent its.

Since for example as well as with light in two various polarizations working mechanisms of the requirements mentioned particularly important cannot fulfill the so called Anaglyphenverfahren, in particular these two known methods only also in each case a Stereobildpaar, thus only a perspective to offer, the invention is based on the principle of the generation of Parallax Panoramagrammen. These have for example the particular advantage that the viewer with change of its position of views on it wins hidden image contents from the prior position, since more than two, in the practice between three and twenty single opinions the order provided become, which offer in pairs in each case a new perspective.

In already other already above mentioned works of Okoshi only applications of this principle for the production of fixed, do not become standing images, z. B. Postcards and such, as well as to the generation of Bildprojektionen compared; also basic premisses mentioned, bottom those out economical vision a realization of such projection mechanisms become are at all more conceivable.

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Except such fundamental problems, which must be dissolved for a practical feasibility, however still other difficulties arise, which are connected in particular with the size of the projection surface and their illuminating. Large projection surfaces, z. B. with diagonals of approx. 2.5 m, require bright projectors. Video projectors, their lenses z. B. already 15 cms diameters have, take more place in claim, than to the viewing distance, corresponds to 65 mm. An arrangement of the single projectors one above the other, in each case lateral against each other around the viewing distance measure offset, leads to significant illustration distortions.

By the fact remedy creates the solution according to invention shown by the subject-matter of the principal claim that the projectors in various panorama fields become disposed. This solution is based on the subsequent considerations:

As panorama fields those areas become referred, repeating in each case in which the reflected beams are more perceptible as Panoramagramme. Since the strips, which become generated of the projectors on the projection surface a rear certain Zylinderlinse, are to be noticed thus both by the same and by adjacent Zylinderlinsen, a cause and effect can D be exchanged. h. the strips a rear certain Zylinderlinse also by irradiation by adjacent Zylinderlinsen produce. Thus the area, in which the projectors must be, becomes considerable extended. Meant, the structural dimensions of the projectors are critical no longer thereby.

With embodiments of the invention in any case three, usually five qualitative equivalent panorama fields are present. Becomes a panorama gram from z. B. 20 projected single opinions generated, are allotted in each case four to projectors to everyone of the five panorama fields mentioned. Stand however z. B. only three panorama fields for the list of the projectors for the order, are allotted to each panorama field up to seven projectors. Since projectors are wider frequent as high, it, despite that other mentioned above illustration distortions, can be favourably, in each case some the projectors, which have their locations in one of the panorama fields to arrange there in various levels. With several panorama fields the same levels should be provided in each case. Like the examples stated above to recognize, rich two various levels omit.

Lenses with large diameter, which are required with projectors regarding high light intensity, can have however a crosstalk with sub pictures to the sequence. This can be avoided in accordance with a corresponding, of preferable embodiment of the invention by the fact that with projectors, which are equipped with lenses their effective opening approx. 100 mm or is larger, lateral diaphragms the beam path in such a way limit that in each case a light depressing opening with the width the corresponding viewing distance - approx. 65 mm - fixed becomes. The light intensity, even if reduced due to the lateral diaphragms the luminous efficiency becomes opposite a complete open lens, is very many higher compared with a lens with only 65 mm diameters.

With the embodiments of the invention a projection screen preferably comes to the use, which is

on its front with a raster from elliptical curved Zylinderlinsen in the screen line dimension p and equipped on its rear side with a reflectance layer, which exhibits a club as characteristic for partial directed reflectance. With the Zylinderlinsen the major axis of the ellipses parallel lies to the screen-flat. The ratio of the large to the minor axis is to be optimized depending upon screen line dimension p, whereby stronger meaning is attached to the central jets than the edge jets. For the screen layout the central jets are more important as the edge jets, D. h. for the edge jets deviations can become problem-free accepted.

Concerning the reflectance layer it turned out that these not ideal should be matte, but by gloss portion the light major vertical forward and through adjacent pitch, with a club as characteristic, reflected becomes.

An other, substantial advantage of embodiments of the invention can be reached, if the projection screen becomes formed as piece of hydraulic cylinder barrel. In particular for far-angular projection, with which the distance is smaller projector/screen same or as the screen-wide, leaves itself thereby disintegrations of the spatial image into its partial images to avoid. Viewers and projection mechanism can be then in for instance in the equal interval of the projection screen.

About it is possible to put the convergence point of the projectors in short distance before the center of the projection screen. This means one, however slight, reduction of the image quality in the central portion, however in favor of an increase of the image quality to the edge.

As of the photographic recording technology known, can be shifted to the elimination isometric distortions also with embodiments of the invention the lenses of other outer disposed projectors from the own optical axis the corresponding rules of the jet set to the center. This measure applies both to planar and curved projection screens.

The maximum number of projectors the certain number of the perspectives, which a panorama gram offers. Falls with moving the head of a viewer into each eye from two stereoscopic to each other conjugated images, the Stereo impression remains obtained, as long as the movement is not larger as the arcs of an angle of approximately 1 DEG. A larger change of the viewer position offers a new perspective to the bottom premisses mentioned, whereby gradually the single representations, which become perceived of the left and right eye of the viewer, change. At the boundary between two panorama fields the viewer then two single opinions become offered, which cause the so called Pseudostereoeffekt, D. h. the third dimension - deep perception - becomes reverse, since the picture impressions for the left and the right eye are exchanged. With a large number of projectors know, also exploitation of the Pseudostereoeffekts, the viewers z bottom in particular. B. also complete different image contents, in each case in one or in several perspectives to be ordered.

To the maximum number of projectors also with embodiments of the invention the formula applies EMI11.1
whereby mean:
p [mm] = screen line dimension or pitch-wide
e [mm] = shortest removal between lens and projection screen
A [mm] = functional horizontal distance between two lenses for the generation of a Stereobildpaares (max. 65 mm)
f [mm] = focal length of the Zylinderlinsen.

The distance of the viewers of the projection screen is to correspond for instance the diagonals and is to practical with the distance between projection screen and projection mechanism to be equated. The pitch-wide the certain limit for the image resolution and is thus predetermined by physiological optical parameters for certain viewer distances. The focal length of the Zylinderlinsen hangs off of the form of their curvature as well as of the refractive index of the lens material. Thus these parameters only slight ones are more variable and by little influence on maximum Projektorzahl.Der minimum value for A are due to the solution according to invention for the arrangement of the projectors no more by the objective and case dimensions of the projectors dependent and can with the so called free diameter of a lens be equated, only the fraction, z. B. 1/5 of the housing-wide of a projector, amount to. The influence of this parameter on the

maximum number of the projectors is thus extraordinary considerable.

For example arises also
p = 0.6 mm
e = 3000 mm
f = 3 mm
and A = 30 mm
for Zmax = 20.

In this connection is the still subsequent advantage of the solution according to invention of practical importance: The production of a projection screen with lens raster is relatively expensive. If one thereby z. B. for p and f, is a lower-priced production possible selects average values, which permit an use even in larger and smaller projection plants. The rendition quality, in particular also a continuous transition between the single strip, D. h. the avoidance of flickering or "image flipping", can become by slight change of the locations of the projectors effected in a simple manner.

In the drawing schematic several details are shown to the closer explanation of the invention and their embodiments. Show:

Fig. 1: the optical ratios for Akkomodation and convergence;

Fig. 2: an example for spatial seeing;

Fig. 3: the optical conditions for spatial seeing;

Fig. 4: the principle of the perception and

Fig. 5: the principle of the generation of Parallax Panoramagrammen by means of lens rasters;

Fig. 6: stereoscopic projection in lens rasters and viewer position;

Fig. 7 and 8: Beam trajectory for projection and reflectance in lens raster screens - without (Fig. 7) and with curvature (Fig. 8) - within the middle and outside screen range;

Fig. 9: Main and Nebenbildbereiche (panorama fields) during a projection mechanism with lens raster screen;

Fig. 10: the course of representative beams of the main and of the sub pictures in the lens raster;

Fig. 11: the characteristic of the radiation distribution of a reflectance layer;

Fig. 12: optical-mathematical parameters for lens rasters;

Fig. 13: a cutout of a lens raster screen with elliptical curved Zylinderlinsen;

Fig. 14: the principle according to invention of the arrangement of the projectors of a projection mechanism for Parallax Panoramagramme in various panorama fields;

Fig. 15: the application of the principle in accordance with Fig. 14 on projection mechanisms with projection tubes for the three primary colors - red, green, blue -;

Fig. 16 and 17: Projector optics with lateral diaphragms

and Fig. 18: an image with the optical-mathematical parameters for the determination of the maximum number of projectors.

On the basis the Fig. 1 first the optical procedures in the eye illustrated become.

Those the rear cornea located lens of the eye projected on the retina an image of the observed space covering the rear eyeball. With Hilfes of the ciliary muscle - depending upon view distance e - the surface curvature of the lens and thus their focal length becomes affected. During corresponding Entfernungseinstellung of the eyes (Akkomodation) on an observed object X simultaneous come through in-wait directed tricks of the eyeballs the view lines located in the viewing distance b with the object X to the section (convergence). The convergence angle becomes with kappa referred.

The retina or retina represents as inner eye skin the light sensitive layer. In the retina pit (Fovea centralis), which from oval shape is, made sharp object perception, horizontal a bottom angle between approximately 3 DEG to 7 DEG and vertical bottom about 3 DEG to 5 DEG. With the normal shortest Sehweite of e = that corresponds to 25 cms to an object area of (30 x 20) mm< of 2>. Since the Sehgrübchen consists of approximately 30,000 tap cells, the eye has only a limited resolving power, which is as minimum visual angles of 1 min defined. D. h. the eye is not with respect to the layer, finer raster points or - lines than such bottom this angle offered to differentiate.

Like Fig. in the space an object with the corner points O, P, Q of both eyes, their mutual distance b shows, becomes 2 approx. 65 mm it amounts to, by various locations from viewed in such a way that the point becomes P fixed. Images O min and Q min of the local points O and Q of the object in different removal of the images P min. develop on the retina of the left and right eye. These deviations become referred as Querdisperation.

With the stereoscopy the eyes simultaneous two images, which are received from different perspective, for each eye become separate offered. These produce a spatial picture impression. Fusing such partial images boundaries are set.

Two stereoscopic partial images become usually received with a lateral displacement - the Stereobasis - of 65 mm.

Also moved scenes received can become. If no temporal conformity of the partial images is required, then the two can with only a camera by lateral displacement or a number of images received become.

In Fig. 3 is shown, as the joint lines of one point of close pn and one point of remote PF with the respective lens centers form outside and inner intersections regarding a meant plane E; there these limit the distances and dl, for their difference as amount of delta, which becomes stereoscopic difference, expressed. An area, in which the angle amount delta is fallen below from 5 seconds to 10 seconds, cannot become any longer spatial perceived. The perception of the spatial depth when plastic seeing delta becomes max = 70 min in the literature indicated as upper value.

The Fig. 4 and 5 shows in principle the generation of Parallax Panoramagrammen. Here the viewer several become, z. B. 6 single representations, D. h. five various perspectives offered. The viewer wins thus with change of his viewpoint new spatial perspectives of the objects in the shown space, D. h. the view on it is ordered to it hidden image contents, if it changes its viewing position. The spatial image effect becomes generated, whereby the space impression in each case of a pair of series of Stereo partial images 1, by the direction-selective effect of a lens raster. . . , 6 caused becomes, which are appropriate for linienförmig rear Zylinderlinsen, which are on the front surface of a lens raster screen LS.

In each case if different stereoscopic each other associated pairs of pictures the bottom lens raster are more visible from different viewpoints, also corresponding other spatial perspective becomes perceived. In Fig. the left eye the strip 4 and the right eye the strip 3 detected has 4. The moved observer the pair of eyes to the left, come first the pair 4, 5 and then the pair 5, 6 into his field of view.

All Stereo partial images become, like Fig. shows 5, from the respective projectors pn (n = 1. . . , 6) one above the other on a projection screen HP thrown. On the way there of the beams the Stereo partial images of the lens raster screen become LS, which is on the front surface of the projection screen HP, into the respective strips focussed. The reflected light beams of the Stereo partial images withdraw from the same lens raster LS and become more visible the viewer separate for each eye.

Like Fig. to recognize, will offer into a planar lens raster screen an LS projected image leaves 6 for a viewer in close proximity of the projection optics its even and brightest impression, since the eyes are there in the beam path of all again beams outgoing incoming into the lens raster screen LS and.

The area for the viewer positions is not however extreme limited. Footstep of the viewers on the projection screen HP too, then is finally in the outer portions of the screen no more spatial picture impression possible (see. Fig. 7).

The distance of the viewers K of the projection and/or. Lens raster screen LS is to correspond in practice in for instance the picture-diagonal. Becomes now, as in Fig. 8 shown, the projection and/or. Lens raster screen LS linear curved, results an improved brightness distribution on the projector screen HP, particularly in the lateral edge zones. In order to make on the whole width of the screen spatial images more visible, the projection surface is to be curved in such a way that longitudinal in each case the main beams of the projectors by the eyes become reflected into the same direction.

In Fig. 9 is the screen PS/LS - the simpleness of the illustration more half - as planar screen shown. As after the managing explanations apparent, become thereby several panorama fields PF generated.

That means: If a viewer takes K, from, alternate positions progressive to the other panorama field PF, then he will notice himself in the single panorama fields continuous changing panorama pictures and in the boundary regions between the panorama fields, as far as a projector is also there, in each case a pseudoskopischen picture impression obtained, with that the change of right and left partial image the permutation of front and rear spatial image contents effected.

The beams of the side pictures with the designations M = 0 to M = 5, most important for the image quality - see. also Fig. 10 - EP = 3000 are mm and 6000 mm and for a representative plate thickness of T = 4 mm of determined and subsequent indicated with the help of a computing program for projector distances:
ZGES = projector number
EP (mm) = view/projection distance
AP (mm) = distance projector/projector viewing distance
ZP (mm) = distance reflected lens jet screen axle
P (mm) = pitch-wide
T (mm) = thickness
R (mm) = lens radius
Y (mm) = beam deflection
N = refractive index
M = pitch factor
EMI19.1

EMI20.1

EMI20.2

EMI20.3

For the projection in the lens raster as opaque a reflectance layer as possible applied must become on the rear side of the projection screen HP. Further the reflective layer should not be matte ideal, but reflect by gloss portion the light of major through adjacent pitch. As characteristic for this one results in Fig. 11 represented club form.

From experiments with laid on colors highly reflecting Alumiumfarbe resulted in the best results. This then by far exceeded through on the sticking side matte-shiny Alumiumfolie, with which the lens raster plates composite to a screen coated became.

Concerning the projection of Parallax Panoramagrammen first still the subsequent general explanations are intended as background information for the description of the other embodiments of the invention.

In the photograph a camera objective, whose focal length fiber plastic is the same format-diagonal D of the film image, becomes referred as a normal objective (contrary to short-focus wide angle objectives and long-focus telephotos).

For H = 24 mm and B = 36 mm arises in the case of the so called small display format fiber plastic

= D = 43.3 mm. The practice has shown that a photographic magnification or a projected image, which became original received with a normal objective its most plastic effect achieved, if it becomes from the removal the format-diagonal viewed. Then the image height becomes and - wide, independent of the size, with receptacle and reproduction the bottom same viewpoints seen. For embodiments of the invention the aspect ratio of the small display format of 24:36 = 2:3 is to become considered. The horizontal viewpoints beta H is thereby 45 DEG, the corresponding vertical viewpoints beta V = 30 DEG. The elevator width ratio is by the way with conventional television screens 3: 4, thus similar.

From practical considerations - dimensions of the projection areas, number of the projectors and their optics and illumination systems and bottom consideration late use of video projectors, also taking place - the diagonal of the projection surface with D = 2500 is to become mm fixed. Thus the height of H = 1387 and the width result of B = 2080 mm in the case of maintained aspect ratio of 2:3.

Further if the viewer distance e = 3000 is mm, thus for instance the diagonals corresponding, then other already above mentioned minimum visual angle of 1 min a minimum dissolvable picture structure of 0.87 mm results from that. Meant, with vertical longitudinal Zylinderlinsen of the lens raster the pitch value p = 0.87 should not be exceeded mm, in order to remain more invisible.

For the projection on such a lens raster screen are z. B. with projectors, which are lateral next to each other constructed, Stereodiapositive in the format (24 x 36) mm< of 2> projected become.

If one proceeds from a planar projection surface, then arises in the case of an arrangement, like it in Fig. 5 shown, trapezoids a distortion of the projected images is inevitable. The further a projector is from the center axis, which vertical stands on the screen center, remote, all the more the distortions will become apparent.

These distortions are to be determined horizontal and vertical. If the vertical distortion affects itself with the fusion of Stereobildern within certain limits only as fuzzy one, a so conditional horizontal displacement a change of the deep perception. Each other associated pixels have themselves lateral against each other shifted.

From the photographic taking up technology a prior art method to eliminate isometric distortions exists in shifting of the camera optics parallel after the laws of the jet set to the film plane and/or. the film plane to the camera optics. Means for embodiments of the invention: If projectors become parallel the projection plane disposed, then slides can become congruently projected, if this opposite the optical axis around an amount dependent of the lateral displacement of the projectors and the Projektionsentfernung shifted become.

With large areas it, as already mentioned, is favourable, to curve the projection screen for the increase of the selectivity of the frames. If viewers and projection lens are in the same area, the curvature z can. B. circular in that horizontal its. Projectors are to be arranged frequent secondary actual because of their dimensions and one above the other, in order to fulfill the condition that the distance from lens does not exceed the limit of the viewing distance of 65 mm to lens. Thus develops an other error, which becomes referred as image height difference. This deviation is to be only reduced, if the difference in height between projectors is as small as possible and the error in the more important picture center becomes small than held at the edge.

The depth of the space in relation to its width is a concrete statement over the spatial impression. With the reproduction from Stereobildern it is from greatest importance around how much this impression becomes regarding the received reality reduced or amplified. The measure for this becomes referred as Stereofaktor.

There are empirical values from the literature, according to which a Stereofaktor of 0,5 as normal perceived became, while a small value as reduced and a larger value than amplified are felt.

Experiments, which became performed in connection with the works at the invention, to have shown that - very much in dependence of the image contents - also by far lower values than natural accepted become. That is of extraordinary importance, there fusing the next and furthest image contents with exploitation of the 70 min - condition largest Sehanstrengungen caused.

Particular one with field recordings with far remote horizon might be considered a Stereofaktor of approximately 20% as complete sufficient.

Materials for conventional lens rasters have a refractive index of n = 1.5 DIVIDED 1.6, high light transmission and small opacity factor.

Receipt such a cylinder lens scan area on the rear side a diffuse reflective layer, then can be made more visible also thereby with the help of several projectors and a number of different Stereo frames in it a Parallax Stereogramm, however high claims of quality the not full satisfied. A partial directed reflectance supplies by far better results. The best Parallax Stereogramme develops, if a sufficient large projector number is in if possible small distance from each other disposed. The optimum case would be, if projection lens beside projection lens lay.

Conventional Zylinderlinsen have circular arc curvature. The lens-wide is at the same time the raster period p ("pitch"). The thickness of the lens raster is contributing together with the screen line dimension p for the projector number and - distance. To Zylinderlinsen it applies that only oh near beams with smaller scatter-wide shown become. The illustration quality is thus dependent of the ratio pitch p to thickness T and/or. of the aperture angle 2 PHI (see. Fig. 12). The per large aperture angles 2 PHI, the observation range of the single Stereopaare is the larger. On the other hand the number of the Stereopaare is limited by their finite scatter-wide. Ever large this becomes, the fuzzier is the image of the rasterized strips. Thus the overall image at sharpness and because of fanning out the beams at spatial depth, withdrawn when withdrawing from the lens raster, loses.

Further it can be proven that an oblique beam in shorter distance to the lens surface focussed than a ohnear.

Hence it follows that for the projection mechanism between the most different defaults a compromise is to be closed, whereby a greater importance is attached to the beams in the center of the raster.

Is of substantial importance for the invention in particular the formation of the Zylinderlinsen. The opening error can become, particularly with large Panoramagrammen with extreme defocus of the edge jets, avoided, if the curvature of the lens is aspheric. In Fig. 13 an easy producible and examinable profile with excellent illustration characteristics shown, an ellipse, is i.e. whose oh conditions depend on the pitch-wide and thickness of the raster, and whose major axis parallel runs to the projection surface.

So can become with a conventional screen line dimension of 0.4 mm with a plate thickness of 1.5 mm with the ellipse of the axial ratio from 1,12 to 1.00 in the comparison the circular cylinder lens of the defocussing errors from -4,6% on 0.1% reduced.

The Fig. the arrangement of the projectors shows 14 in a projection mechanism according to the invention. Due to large sizes of the lenses and/or. Housing of the projectors pn, without which the required light intensity for wide projections could not become the order provided, is their arrangement such as z. B. in Fig. 5, 6, 7, 8 and 9 shown, D. h. direct and narrow next to each other in the same panorama field PF, not possible. Like already in connection with the explanations to the figs mentioned mentioned, arrive the light beams on the path of the projectors pn at the lens raster projection screen LS by the lenses of the raster and become both by the lens through-irradiated on the way there and by their adjacent Zylinderlinsen reflected. This effect that generated strip can in each case the Zylinderlinse rear in the screen line dimension p be noticed also by adjacent Zylinderlinsen, becomes according to invention to that extent reverse after the solution, when for the generation of the strips a rear Zylinderlinse also their adjacent lenses are already consulted. Meant, the projectors pn can be in various panorama fields PF, whose distance is from each other a multiple one of a single Stereogrammes. The dimensions of the projectors are uncritical thereby concerning their arrangement in the projection mechanism. They can be - after possibility - in the same level Hj mounted, so that as image height difference in appearance stepping projection errors are from the beginning avoidable.

With panorama fields PF with z. B per 6 frames, which should be more perceptible in the viewing distance of 65 mm in each case, is the width of the panorama field PF nearly 400 mm. Three

panorama fields PF are to in any case at the disposal, thus nearly 1200 mm for 6 projectors, in the example mentioned thus per projector about 200 mm.

Since in each panorama field PF an emitted light beam becomes also into the same direction reflected, the frames for the respective projectors pn must become so rearranged that this condition becomes satisfied. The projectors in Fig. 14 is accordingly numbered.

Fig. the application of the principle shows 15 in accordance with Fig. 14 on a projection mechanism, become inserted with which video projectors with separate projection tubes for the three primary colors - red, green, blue -. The width single pipes with optics may not exceed the actual viewing distance. The arrangement of such projection tubes can become only so made that the three primary colors for in and the same become stereo partial image on three panorama fields PF distributed. Meant for the example, in a first panorama field PF all projection tubes for the primary color red for all Stereo partial images, in a second panorama field PF the primary color the green are, third the primary color the blue. With conventional three-tube projection mechanisms the projection would be into lens raster screens only also one above the other disposed projection tubes for the three primary colors possible. This would have the already other adverse distortions already above mentioned to the sequence. The arrangement in accordance with Fig. 15 allowed in particular, by mirror devices of a single projection tube the function of also adjacent projection tubes to transmitted, D. h. To save projection mechanisms.

As more other above to Fig. 9 mentioned, is also in the Fig. 14 and 15 the screen PS/LS only the simpleness of the illustration more half without curvature in accordance with Fig. 8 shown. Those particularly preferable embodiments of the invention point except in Fig. 14 and 15 indicated details also the curvature of the screen PS/LS in accordance with Fig. 8 up.

The Fig. 16 and 17 shows lenses of projectors, whereby to the achievement of an high light intensity large lenses use are to find. In order to avoid a crosstalk between adjacent frames, the lenses are provided with lateral shading diaphragms B. Only light outlets of approx. become. 65 mm of width released. These are however apparent more brightly than objects with only 65 mm diameters and have above all the advantage that become shown by the geometry of the diaphragm the vertical edges and lines with better sharpness and higher contrast, responsible for stereoscopic seeing.

In Fig. 18 is to the illustration of design fundamentals for the determination of the maximum projector number of Zmax the associated parameters A, e, f and p indicated.

Over the works accomplished in connection with the invention introduced here reported also in a publication, which - at least partly, becomes - is to appear in the August stapling 1985 of the magazine “television and cinema technique”.